

Patent Claims

1. An arrangement for optically determining the distance of a reflecting surface onto which light from
5 a light source is directed via a first optical fiber and from which reflected light passes onto at least one statically arranged optical detector via the first optical fiber or at least one further optical fiber, characterized in that the light runs on to the
10 reflecting surface (4) and from the reflecting surface (4) via at least one optical element (2), collimating in the direction of the reflecting surface (4), and at least two optical elements (3') that focus in the direction of the reflecting surface (4) and whose
15 optical axes are aligned parallel to the optical axis of the collimating optical element (2) and are arranged at prescribed spacings from one another.

2. The arrangement as claimed in claim 1,
20 characterized in that several focusing optical elements (3') form a row arrangement along an axis or form an array arrangement in a number of rows.

3. The arrangement as claimed in claim 1 or 2,
25 characterized in that the focusing optical elements (3') are arranged equidistantly from one another.

4. The arrangement as claimed in one of the preceding claims, characterized in that the focusing optical
30 elements (3') are arranged at a constant distance from the collimating optical element (2).

5. The arrangement as claimed in one of the preceding claims, characterized in that the focusing optical
35 elements (3') are constructed as cylindrical lenses.

6. The arrangement as claimed in one of the preceding claims, characterized in that the convex surfaces of the focusing optical elements (3') are aspherically

curved.

7. The arrangement as claimed in one of the preceding claims, characterized in that the collimating optical
5 element (2) is a plano-convex optical lens.

8. The arrangement as claimed in one of the preceding claims, characterized in that the convex surface of the collimating optical element (2) is aspherically curved.
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9. The arrangement as claimed in one of the preceding claims, characterized in that the end face of the at least one further optical fiber (5), into which the reflected light can be coupled, is arranged immediately
15 next to the end face of the first optical fiber (1) from which light from the light source exits.

10. The arrangement as claimed in one of the preceding claims, characterized in that in the case of an arrangement where light from an end face of a first optical fiber (1) is directed onto the reflecting surface (4), and light reflected from there can be coupled into the end face of this optical fiber (1), a fiber brancher/backward coupler is present for light
20 from the light source and for reflected light to the optical detector.
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11. The arrangement as claimed in one of the preceding claims, characterized in that the end face(s) of the first optical fiber and/or the at least one further optical fiber (5) is/are aligned orthogonal to the optical axis of the collimating optical element (2).
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12. The arrangement as claimed in one of the preceding claims, characterized in that the first optical fiber (1) and/or the at least one further optical fiber (5) is/are in each case aligned at an obliquely inclined angle with reference to the optical axis of the collimating optical element (2).
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13. The arrangement as claimed in one of the preceding claims, characterized in that the first optical fiber (1) and/or the at least one further optical fiber (5) is/are arranged offset from the optical axis of the collimating optical element (2).

14. The arrangement as claimed in one of the preceding claims, characterized in that a transmission grating is constructed on the end face of the first optical fiber (1).

15. The arrangement as claimed in one of the preceding claims, characterized in that the light source is an LED or a laser diode.

16. The arrangement as claimed in one of the preceding claims, characterized in that the reflecting surface (4) is a part of a pellicle or is arranged on a pellicle.

17. The arrangement as claimed in one of claims 1 to 16, characterized in that free spaces are present between focusing optical elements (3') or through holes (7, 7') are constructed.

18. The arrangement as claimed in one of claims 1 to 17, characterized in that at least one further beam-shaping optical element (6) is arranged between a collimating optical element (2) and focusing optical elements (3'), or beam-shaping elements are integrated in the collimating optical element (2).

19. The arrangement as claimed in claim 18, characterized in that the beam-shaping optical element (6) is a telescope array arrangement.

20. The arrangement as claimed in claim 18, characterized in that the beam-shaping optical

element(s) (6) is/are diffractive or refractive optical elements.

21. The arrangement as claimed in one of the preceding
5 claims, characterized in that the arrangement forms an optical microphone.